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USER MANUAL
PDCI-30 PROGRAMMABLE CDI IGNITION

TECHNICAL DATA

Limit values:

- minimum revs	200 RPM
- maximum revs	20000 RPM
- minimum supply voltage	7 Volts
- maximum supply voltage	18 Volts
- stand-by current draw	< 0.05 Amp
- current draw at 1300 RPM	< 0.4 Amp
- current draw at 12000 RPM	< 2.4 Amp
- maximum continuous current for shift light and power jet output	1 Amp
- peak current for shift light and power jet output	5 Amp
- constant spark energy from idle to 14000 RPM	>35mJ

Circuit is protected against reverse supply voltage (wrong connection).

Features:
- fast power-up
- full power starting spark energy already at 7Volts power supply
- 3 isolated inputs for pickups
- 3 independent ignition coil outputs
- individual advance/retard of each output
- store and load function for two ignition maps
- external switch for changing ignition map while riding
- shift light output
- power jet output
- quick shift (shift kill)
- soft rev limit (three stage rev limit)
- tachometer output
- easy and fast programming on the field, via hand held programmer
- PC-USB programming
- programming while machine running - you can immediately see effects
- each curve can be set in 4 to 12 curve points
- signal delay compensation
- instant monitoring of rev's and angle, via hand held programmer and PC
- timing calculation for every 1 RPM change (1000, 1002, .. , 9805, 9806, ...)

Very important!
Resistor spark plugs must be used, because they produce less electromagnetic disturbances.

Danger of electric shock!
Avoid connecting PDCI to 12V power supply, before connecting it to ignition coil. High voltage is generated and touching free wires can cause electric shock, or damage the unit.

1. HOW TO ENTER MENU

PDCI must be connected to power supply. Connect **programmer** to **PDCI** and wait few seconds for activation of **programmer** and then press [enter]. With pressing [+] or [-] you can move through menu and with pressing [enter] you can choose.
You can exit menu with choosing ***Exit.***

2. MENU ORGANISATION

Load Ign. Map	- load (select) ignition map (from #1 to #2)
Save Ign. Map	- save new ignition map (from #1 to #2)
Set Ignition Map	- ignition map parameters submenu
Advance	- advance/retard whole ignition map on both ignition coil outputs
Advance 1	- advance/retard ignition coil output 1
Advance 2	- advance/retard ignition coil output 2
Advance 3	- advance/retard ignition coil output 3
Gear Shift Light	- shift light
Quick Shift	- quick shift settings
Rev Limit	- rev limit
Static Angle	- static angle (stator position)
Compensation	- signal delay compensation (from pickup to spark plug)
Power Jet 1	- power jet 1
Ign. Map SW	- activating/deactivating external switch for selecting ignition map
Nr. of Pickups	- number of connected pickups
Ignition Test	- test ignition spark
Exit	

3. LOAD IGN. MAP

Enter menu and move to ***Load Ign. Map*** with pressing [+] or [-] and then press [enter] .
Now you can select number of saved ignition map, with pressing [+] or [-] and then press [enter] .

4. SAVE IGN. MAP

Enter menu and move to ***Save Ign. Map*** with pressing [+] or [-] and then press [enter] .
Now you can select number to which you want to save your ignition map, with pressing [+] or [-] and then press [enter] .

5. SET IGNITION MAP

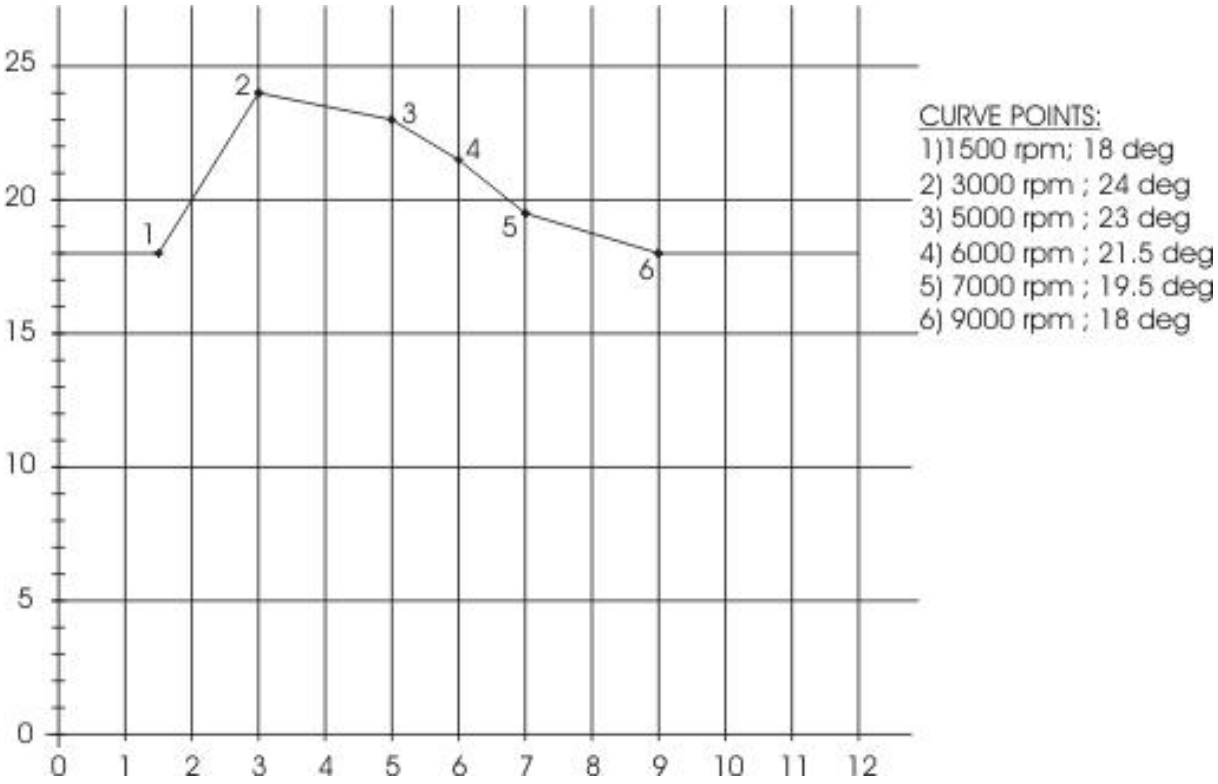
Enter menu and move to ***Set Ignition Map*** with pressing [+] or [-] and then press [enter].
...you entered submenu for setting ignition map.

Submenu organisation:

Nr. of Points	- number of ignition curve points (from 4 to 12)
1)	- first ignition curve point
2)	- second ignition curve point
...	...
...	...
Exit	- exit submenu

Important!
To avoid wrong processing, don't make unreasonable curve course.
Every time you make any changes to ignition curve, it is automatically saved to number #0.
Later you can save it to any other number #1 or #2.

Curve Example with six curve points:



5.1. Change NUMBER OF IGNITION CURVE POINTS

Move to ***Nr. of Points*** with pressing [+] or [-] and then press [enter] .
Now you can select number of ignition points, with pressing [+] or [-] and then press [enter] .

5.2. Change PARAMETERS OF IGNITION CURVE POINT

Move to point you want to change, with pressing [+] or [-] and then press [enter] .
Now you can change rev point with pressing [+] or [-] (in 100 rpm steps) and then press [enter] .
Now you can change advance angle with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

6. ADVANCE

With this setting is possible to advance, or retard whole ignition map on both ignition coil outputs. When setting is positive, then ignition map is advanced and when setting is negative, than ignition map is retarded. Ignition map is unchanged, with setting ***0.0deg***.

Enter menu and move to ***Advance***, with pressing [+] or [-] and then press [enter] .
Now you can set advance with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

7. ADVANCE 1

With this setting is possible to advance, or retard ignition map only on ignition coil output 1. When setting is positive, then ignition map is advanced and when setting is negative than, ignition map is retarded. Ignition map is unchanged, with setting ***0.0deg***.

Enter menu and move to ***Advance 1***, with pressing [+] or [-] and then press [enter] .
Now you can set advance with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

8. ADVANCE 2

With this setting is possible to advance, or retard ignition map only on ignition coil output 2. When setting is positive then, ignition map is advanced and when setting is negative than, ignition map is retarded. Ignition map is unchanged, with setting ***0.0deg***.

Enter menu and move to ***Advance 2***, with pressing [+] or [-] and then press [enter] .
Now you can set advance with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

9. ADVANCE 3

With this setting is possible to advance, or retard ignition map only on ignition coil output 3. When setting is positive then, ignition map is advanced and when setting is negative than, ignition map is retarded. Ignition map is unchanged, with setting ***0.0deg***.

Enter menu and move to ***Advance 3***, with pressing [+] or [-] and then press [enter] .
Now you can set advance with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

10. GEAR SHIFT LIGHT

Enter menu and move to ***Gear Shift Light*** with pressing [+] or [-] and then press [enter] .
Now you can change rev point with pressing [+] or [-] (in 100 rpm steps) and then press [enter] .

11. QUICK SHIFT

Enter menu and move to ***Quick Shift*** with pressing [+] or [-] and then press [enter] .
...you entered submenu for quick shift settings.

Submenu organisation:
Shift Kill Time - basic kill time
Smart Shift - activating/deactivating automatic kill time for different revs
Exit - exit submenu

11.1. SHIFT KILL TIME

Enter ***Quich Shift*** menu and move to ***Shift Kill Time*** with pressing [+] or [-] and then press [enter].
Now you can change kill time with pressing [+] or [-] (in 10 ms steps) and then press [enter] .

11.2. SMART SHIFT

Smart shift function automatically adjusts kill time for different revs. Shift kill time must be always set, as basic kill time.
Enter ***Quich Shift*** menu and move to ***Smart Shift*** with pressing [+] or [-] and then press [enter].
Now you can enable, or disable function with pressing [+] or [-] and then press [enter] .

12. REV LIMIT

Enter menu and move to ***Rev Limit*** with pressing [+] or [-] and then press [enter] .
Now you can change rev limit with pressing [+] or [-] (in 100 rpm steps) and then press [enter] .

13. STATIC ANGLE

Enter menu and move to ***Static Angle*** with pressing [+] or [-] and then press [enter] .
Now you can set static angle with pressing [+] or [-] (in 0.1deg steps) and then press [enter] .

14. COMPENSATION

It is compensation of signal delay from pickup to spark plugs. You can check this delay with stroboscope lamp. Without this compensation, ignition advance angle decreasing with rising revs.
This compensation helps that advance angles in ignition curve are real (more accurate).

How to check, if compensation is correct:
First you must set flat ignition curve. Then measure with stroboscope lamp, if mark at flywheel moving when changing revs. If mark moving then you must change compensation delay.

Change Compensation:
Enter menu and move to ***Compensation*** with pressing [+] or [-] and then press [enter] .
Now you can change compensation delay with pressing [+] or [-] and then press [enter] .

15. POWER JET 1

Enter menu and move to ***Power Jet 1*** with pressing [+] or [-] and then press [enter] .
...you entered submenu for setting ***Power Jet 1*** parameters.

Submenu organisation:

Power Jet 1 ON RPM	- revs for activating power jet 1
Power Jet 1 OFF RPM	- revs for deactivating power jet 1
Exit	- exit submenu

Example:
Power jet 1 ON (RPM) = 8000rpm
Power jet 1 OFF (RPM) = 10000rpm

Power jet is switched on when revs are between 8000-10000rpm, otherwise power jet is switched off.

15.1. POWER JET 1 ON RPM

Enter menu and move to ***Power Jet 1 ON RPM*** with pressing [+] or [-] and then press [enter] .
Now you can change ***Power Jet 1 ON RPM*** with pressing [+] or [-] (in 100 rpm steps) and then press [enter] .

15.2. POWER JET 1 OFF RPM

Enter menu and move to ***Power Jet 1 OFF RPM*** with pressing [+] or [-] and then press [enter] .
Now you can change ***Power Jet 1 OFF RPM*** with pressing [+] or [-] (in 100 rpm steps) and then press [enter] .

16. IGN. MAP SW

Enabling, or disabling ignition map switch, for changing ignition maps while riding.

Enter menu and move to ***Ign. Map SW*** with pressing [+] or [-] and then press [enter] .
Now you can enable or disable external switch with pressing [+] or [-] and then press [enter] .

17. NUMBER OF PICKUPS

PDCI can run with 1, or 3 pickups.
When using one pickup, then all 3 ignition coils fire at the same time.
Enter menu and move to ***Nr. of Pickups*** with pressing [+] or [-] and then press [enter].
Now you can change nr. of pickups with pressing [+] or [-] and then press [enter] .

18. IGNITION TEST

Spark execution test without running engine. Spark can be optically checked, with removed spark plug connected to plug cup and to the ground.

Enter menu and move to ***Ignition Test*** with pressing [+] or [-]. With pressing [enter] multiple spark will occur, for about 1s for each output channel.

19. MECHANICAL SETTINGS (Static Angle)

Static Angle is ignition advance angle, set with stator (generator).
Measure this angle with dial gauge. This measured **Static Angle** is your maximum advance angle you can set with **PDCI**.

Calculating mm to deg or vice versa:

α = ignition advance in degrees
T = ignition advance in mm
R = engine stroke divided by 2 in mm
L = conrod length in mm

$$P = R + L - T$$

$$\alpha = \cos^{-1}\left(\frac{P^2 + R^2 - L^2}{2 \cdot P \cdot R}\right)$$

$$T = L + R \cdot (1 - \cos\alpha) - \sqrt{L^2 - (R \cdot \sin\alpha)^2}$$

20. MONITORING

Connect **programmer** to **PDCI** and wait few seconds for activation of **programmer.** Fist information displayed on the **programmer** is software version.

With **programmer** you can watch revs, calculated advance ignition angle, TPS position...depends on setting in the menu.

Information!
You can connect or disconnect **PDCI** unit from **programmer** any time you want, without any harm. It is not important, if motor running or not and if power supply is connected or not.

Important!
Do not use too much force when connecting or disconnecting **programmer** unit!

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How to measure static angle?

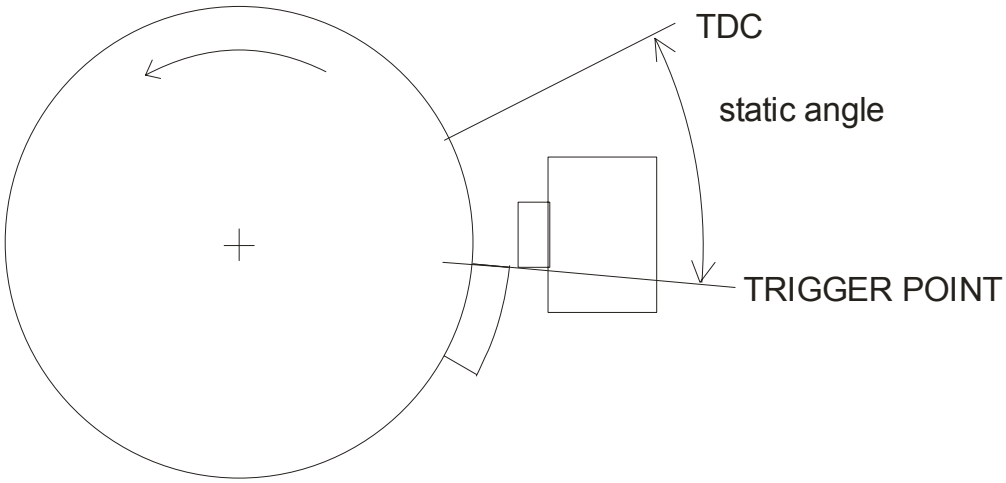
The most accurate procedure is with dial gauge.

Apply to single and multiple cylinder engines.

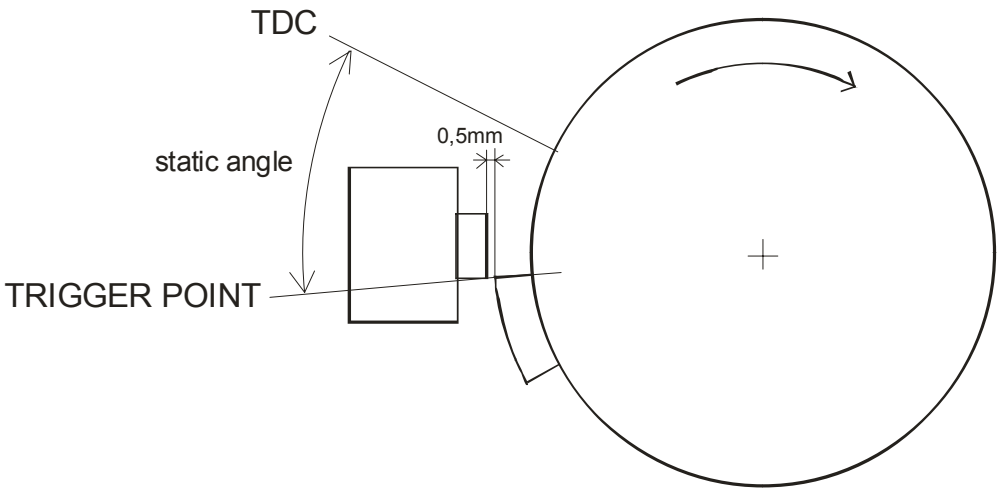
Necessary tools:
- stroboscope light
- dial gauge

Follow the procedure:
⇨ measure approximate static angle, just to have starting point...look at drawing below.

Anticlockwise rotation:



Clockwise rotation:



⇨ program CDI with measured approximate static angle
⇨ program CDI with flat ignition curve...16deg advance is suitable for most engines.
⇨ find information about engine stroke and conrod length
⇨ convert programmed flat ignition advance angle to millimetres

Example:
α =16deg (ignition advance)
L=110mm (conrod length)
R=54/2=27mm (engine stroke divided by 2)
T=1,3mm (calculated ignition advance in mm)

Equation for calculating from degrees to millimetres:

$\alpha = \text{ignition advance in degrees}$

$T = \text{ignition advance in mm}$

$R = \text{engine stroke divided by 2 in mm}$

$L = \text{conrod length in mm}$

$$T = L + R \cdot (1 - \cos\alpha) - \sqrt{L^2 - (R \cdot \sin\alpha)^2}$$

⇨ remove sparkplug from cylinder head and place dial gauge
⇨ find TDC (Top Dead Centre)
⇨ rotate engine backwards (opposite from engine running rotation) to calculated advance in millimetres (in example is 1,3mm) and make marks on rotor and stator
⇨ remove dial gauge and place sparkplug back to cylinder head
⇨ start engine and run with constant revs of about 3000rpm, or 4000rpm
⇨ use stroboscope light to check, if marks on rotor and stator align
⇨ adjust static angle with programmer to align marks on the rotor and stator

Result of above procedure is very accurate static angle.